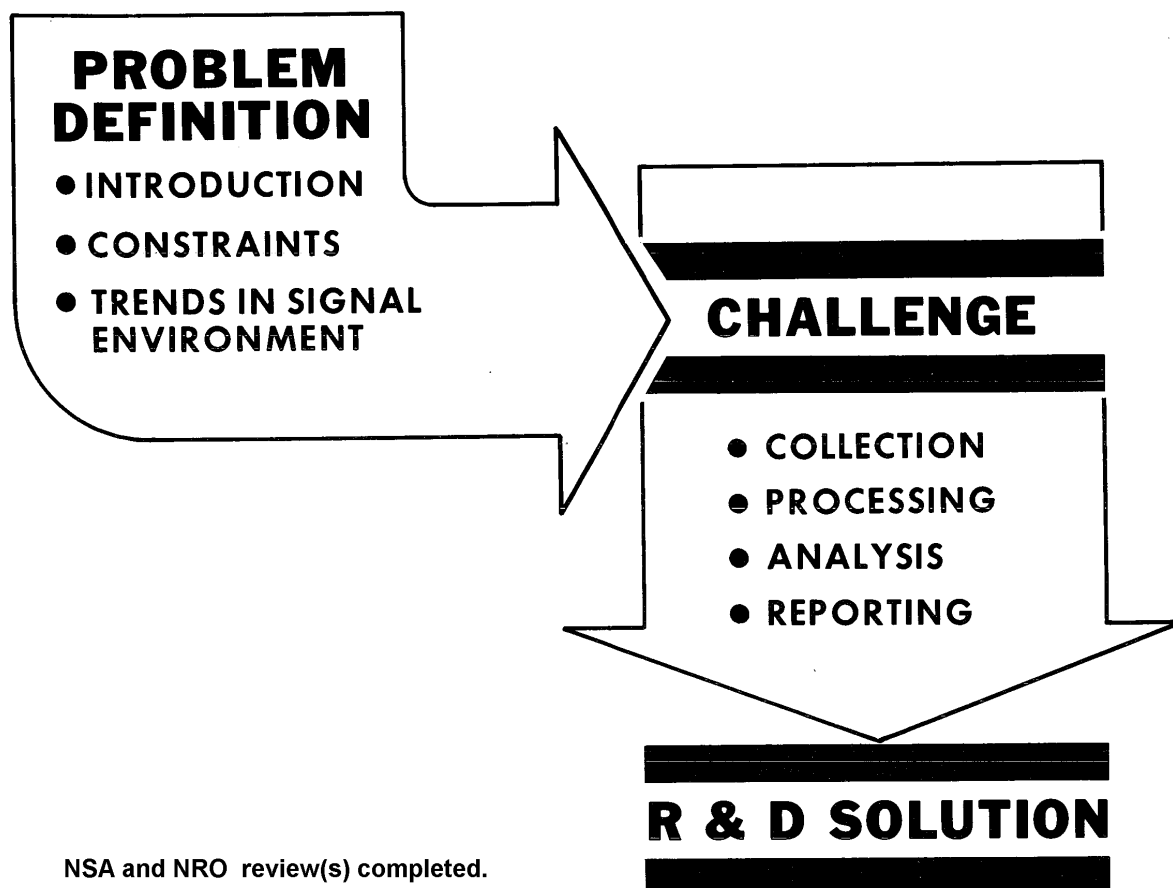


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NSA and NRO review(s) completed.

OSD REVIEW COMPLETED

GTE SYLVANIA | ELECTRONIC SYSTEMS GROUP
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SECRET

CONSTRAINTS (U)

- SYSTEM COST
- MANPOWER LIMITATIONS
- FOREIGN REAL ESTATE
- SUPPORT COMMUNICATIONS
- PLATFORM LOCATION / OPERATION

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SECRET
HANDLE VIA COMINT CHANNELS

SECRET SPOKE

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SIGNAL ENVIRONMENT TRENDS (U)



INCREASING SYSTEM CAPACITY

- SOVIET BLOC / PRC
- OTHER COUNTRIES



INCREASING USE OF FREQUENCY SPECTRUM

- DENSITY
- EXPANSION



INCREASING VARIETY OF SIGNAL MODULATIONS

- PSK

- DATA TRANSMISSION
- ENCRYPTION



INCREASING USE OF AUTOMATIC SWITCHING



MULTIPLE MEANS/PATHS

25X1

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COLLECTION (U)

PROBLEM AREAS	SOLUTIONS
---------------	-----------

- FOREIGN SITES
 - COST
 - MANPOWER

- REMOTE/UNATTENDED SYSTEMS

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SIGNAL PROCESSING (U)

PROBLEM AREAS	SOLUTIONS
---------------	-----------

--	--

- INFORMATION EXTRACTION
 - VOLUMES OF CONVENTIONAL SIGNALS
 - DATA SYSTEMS
 - ENCRYPTION SYSTEMS

- LOAD SMOOTHING
- SIGNAL PARAMETER ANALYSIS
- DATA CORRELATION AND DISPLAY
- SELECTIVE TASKING/MISSION MANAGEMENT

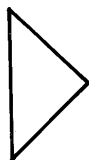
ANALYSIS & REPORTING (U)

PROBLEM AREA	SOLUTIONS
<p>CONCLUSION OF ANALYSIS TO BE MADE WHICH IS CONSIDERED TO BE THE MOST PROBABLE SOLUTION TO THE PROBLEM AS PRESENTED</p> <p>THE ANALYST SHOULD BE AWARE OF THE FACT THAT THE ANALYSIS IS ONLY A GUIDE TO THE DECISION MAKER AND NOT A SUBSTITUTE FOR HIS JUDGMENT</p>	<ul style="list-style-type: none"> ● INFORMATION CORRELATION <ul style="list-style-type: none"> ● EXTERNALS WITH INTERNALS ● MULTIPLE SOURCE INPUTS ● SITUATION RECOGNITION <ul style="list-style-type: none"> ● EVENTS ● TRENDS ● ANOMALIES ● FILE RETRIEVAL AND MAINTENANCE ● DECISION THEORY

SECRET

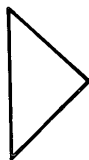
PRESENT AND NEAR TERM STATUS (U)

COLLECTION



- OCEAN BASED PLATFORMS
- REMOTE UNATTENDED RECEIVER
- REMOTE GROUND SITES

PROCESSING

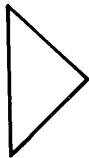


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- SMMS

PL 86-36

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ANALYSIS AND REPORTING

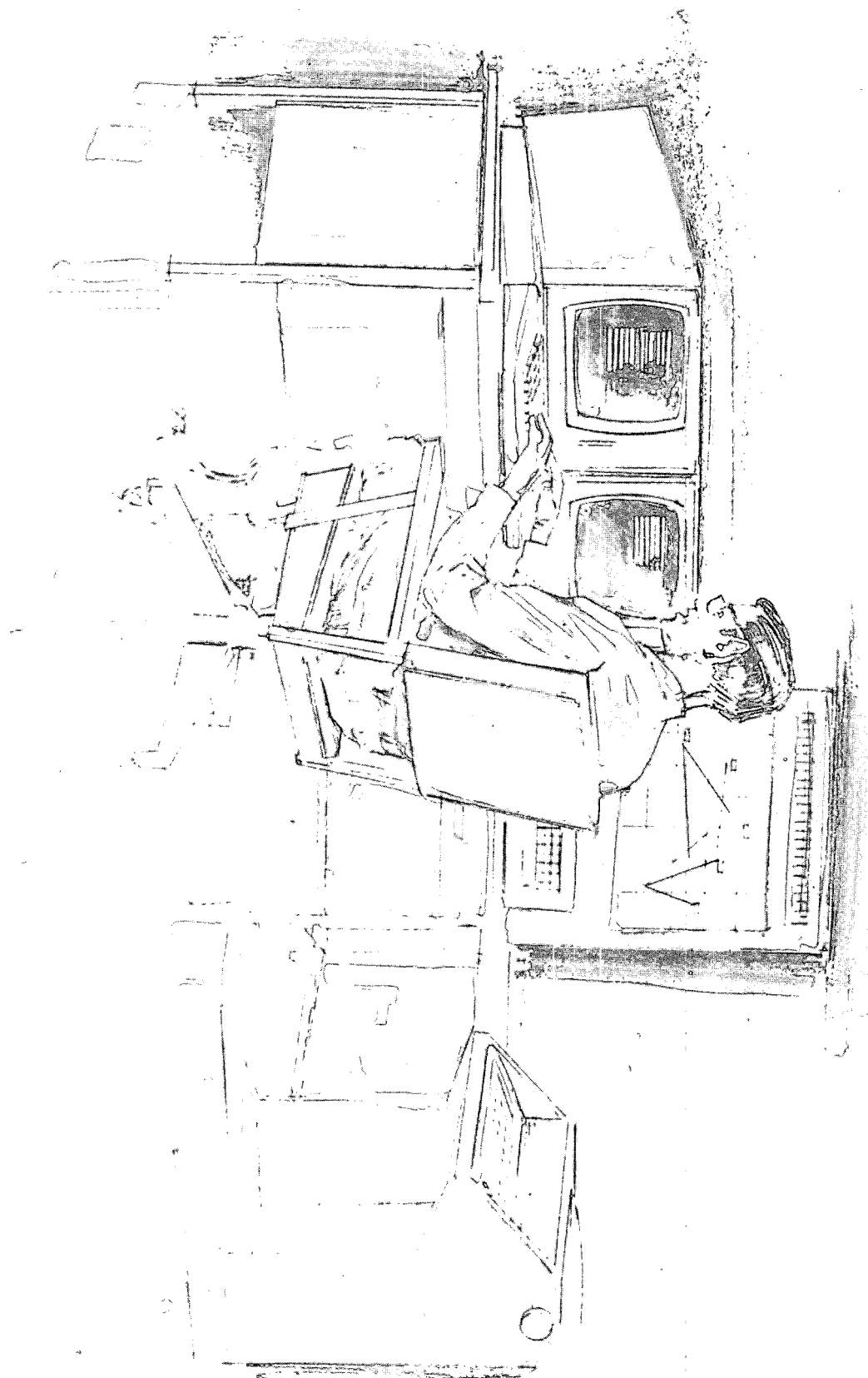


- CONTROL ANALYSIS AND REPORTING CENTER
- CENTRAL ANALYSIS CENTER

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HANDLE VIA COMINT CHANNELS



EMPHASIS ON FUTURE R & D (U)

REMOTE/ UNATTENDED SYSTEMS



- LOW COST
- FLEXIBLE DEPLOYMENT
- REDUCED LEAD TIME
- COMPACT
- LOW POWER DRAIN



- LOW POWER DRAIN
- MICROELECTRONICS
- HIGH DENSITY
- MASS STORAGE
- MICROPROCESSORS
- DELIVERY

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MISSION MANAGEMENT/ ANALYSIS AND REPORTING



- OPERATIONAL IMPACT
- USER ORIENTED



- DECISION THEORY
- PATTERN RECOGNITION
- INFORMATION STORAGE
AND RETRIEVAL

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CHARTER

- REQUESTED BY DIRECTOR, DDR&E
- REVIEW PAST AND PRESENT STUDIES

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- SUGGEST INNOVATIVE DESIGNS
- PROPOSE NEW SYSTEMS AND OPERATING CONCEPTS

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MR. FREDERICK H. KAUFMAN

MR. EDWARD OFFENHARTZ

DR. HAROLD A. ROSEN

DR. MICHAEL I. YARYMOVYCH

LT COL FRANK A. PAPAROZZI

UNDER SECRETARY OF THE AIR FORCE

LOCKHEED MISSILE & SPACE COMPANY

ROCKWELL INTERNATIONAL CORPORATION

DDR&E

BOEING AEROSPACE COMPANY

GENERAL ELECTRIC COMPANY

TRW SYSTEMS

GRUMMAN AEROSPACE CORPORATION

HUGHES AIRCRAFT COMPANY

CHIEF SCIENTIST, U.S. AIR FORCE

EXECUTIVE SECRETARY, U.S. AIR FORCE

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ACTIONS TO DATE

• BRIEFED BY SAMSO, NAVY, SAF/SP, AND NASA

• CURRENT & PLANNED SYSTEMS

• TRANSITION PLANS

CONDUCTED INITIAL ANALYSES

• SHUTTLE OPERATIONS

• ORBITER/PAYLOAD INTERFACE

• SHUTTLE UTILIZATION

• SERVICING OF HIGH VALUE PAYLOADS

• SPACELAB

• FUNCTIONS OF MAN

• IUS

• EFFICIENT USE OF SHUTTLE VOLUME

• TITAN III - SHUTTLE TRANSITIONING

• LARGE DIAMETER SHROUD

• SOLID UPPER STAGES

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COMMITTEE POSITION ON PAYLOAD/ORBITER INTERFACE

- ORBITER MONITOR FOR MAN SAFETY ONLY
- ORBITER COMMANDS LIMITED TO SAFEING PAYLOAD FOR ABORT
- NO PAYLOAD CHECKOUT PRIOR TO RELEASE
 - USE EXISTING SATELLITE CONTROL FACILITIES
 - COMPLEX ANALYSIS REQUIRED
 - LARGE DOD/CONTRACTOR DECISION TEAM ON GROUND
- ORBITER STANDBY FOR ASSISTANCE AND RETRIEVAL
- KEEP INTERFACE SIMPLE TO MINIMIZE COSTS

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SERVICING OF CURRENT HIGH VALUE PAYLOADS IN LOW EARTH ORBIT

- ON-ORBIT SERVICING OF EXPENDABLES DOES NOT APPEAR ATTRACTIVE
- DEDICATED SERVICING LAUNCHES WOULD BE REQUIRED BY THE WEIGHT OF EXPENDABLES - MOST HIGH VALUE PAYLOADS UTILIZE SHUTTLE CAPABILITY
- HIGH DEVELOPMENT COSTS FOR AUTOMATED ON-ORBIT REPAIR DEVICES OFFSET POTENTIAL SAVINGS
- SATELLITE REPLACEMENT & RETURN CAN BE ACCOMPLISHED BY THE SAME LAUNCH
- LOW VALUE OF SATELLITE RETURN & REFURBISHMENT DRIVEN BY
 - TECHNOLOGICAL OBSOLESCENCE OF LONG LIFE HARDWARE
 - POTENTIAL DAMAGE AND CONTAMINATION TO OPTICAL HARDWARE DURING RETURN

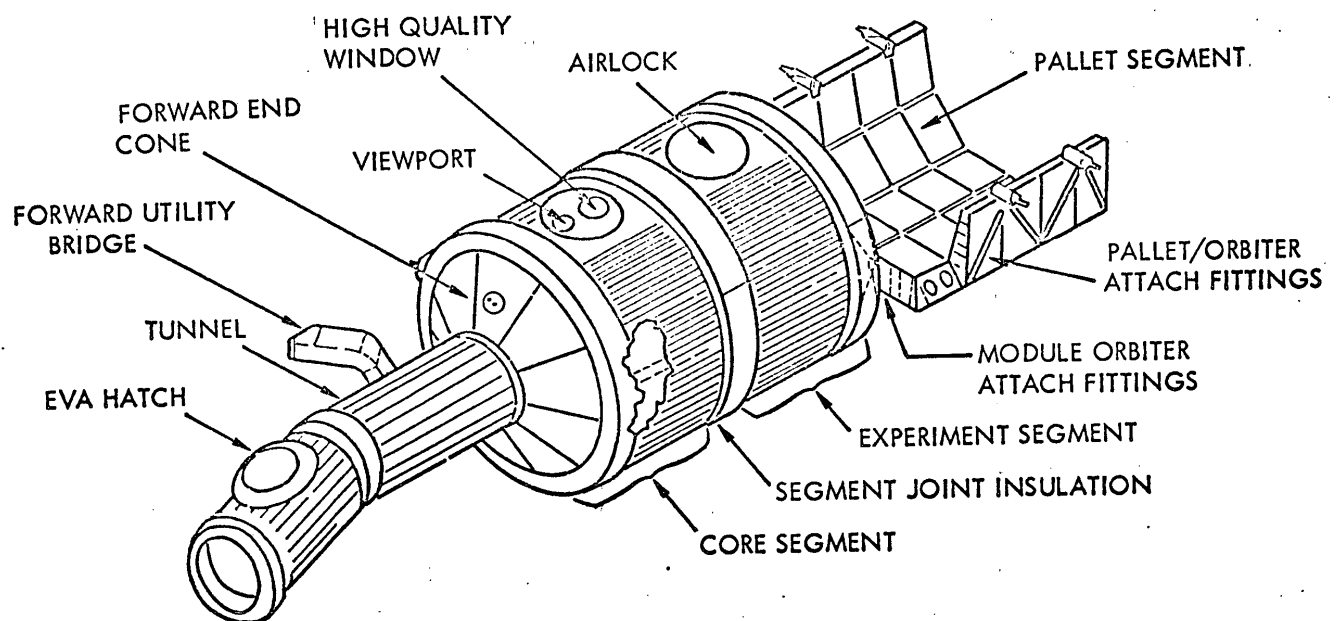
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SPACELAB BASIC HARDWARE ELEMENTS

(Mixed Mode)



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POTENTIAL DOD SPACELAB USAGES

- DOD BASIC RESEARCH LABORATORY
- DEVELOPMENT TEST BED FOR DOD MISSION EQUIPMENT:
 - SURVEILLANCE
 - WEAPONRY
 - NAVIGATION
 - COMMUNICATIONS
 - SATELLITE INSPECTION
 - METEOROLOGY
 - SPACECRAFT SUBSYSTEMS
- SHORT TERM OBSERVATION PLATFORM
 - 7 TO 30 DAY MISSION

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FUNCTIONS OF MAN

- SUBSYSTEM DEVELOPMENT TESTING
- CRISIS MANAGEMENT OBSERVATION
- CAPTURE OF NON-COOPERATIVE SPACECRAFT
- RECOVERY OF PARTS OF SPACECRAFT
- DEPLOYMENT, ERECTION, & ASSEMBLY OF LARGE STRUCTURES

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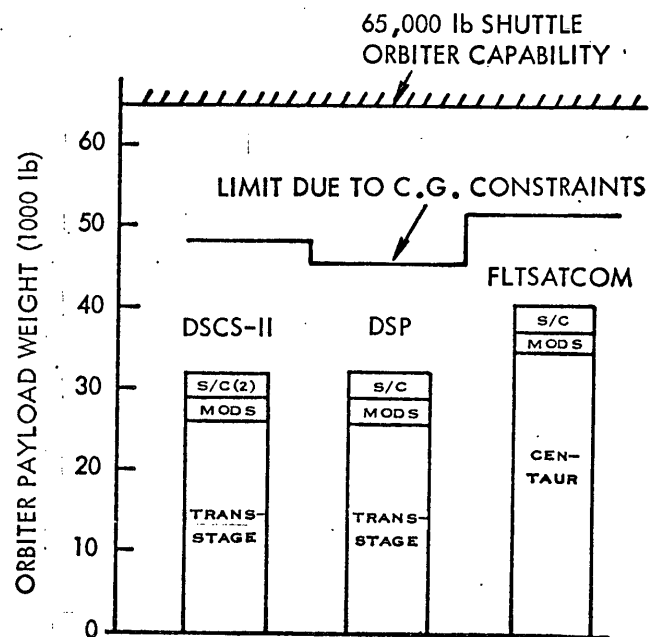
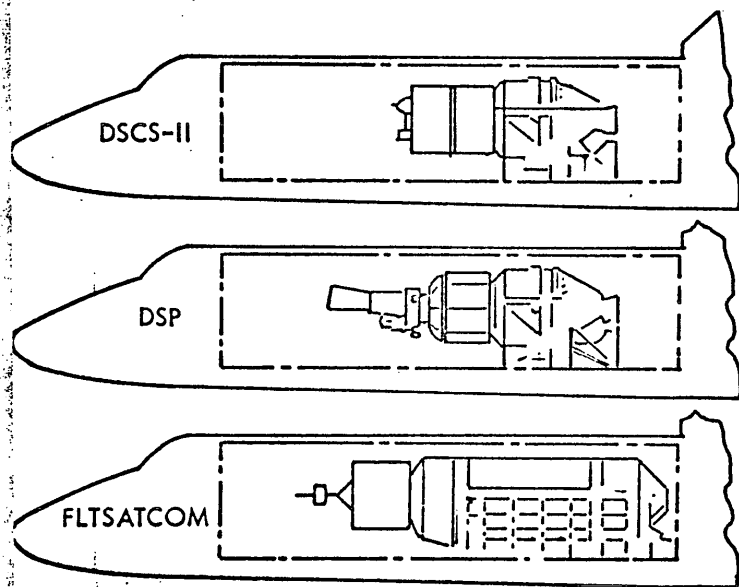
HIGH ENERGY ORBITS STUDY

- FIVE YEAR DOD MISSION MODEL
- FIFTEEN HIGH ENERGY MILITARY MISSIONS
- EVALUATED COMBINED MISSIONS TO MAXIMIZE SHUTTLE UTILIZATION
- COMPARED SOLID ROCKET MOTORS AND LIQUID STAGES
- CONSIDERED SHUTTLE LOADING AND PAYLOAD SUPPORT CONSTRAINTS

10a

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LAUNCH OF CURRENT DOD SPACECRAFT WITH THEIR PRESENT UPPER STAGE



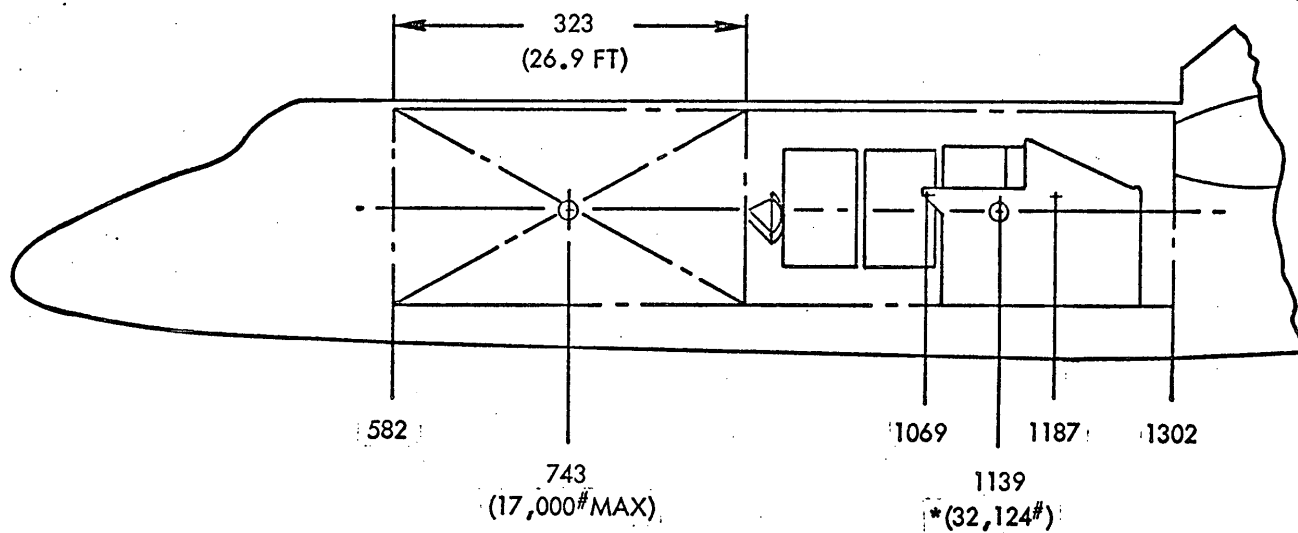
BASED ON "DOD STS PAYLOAD INTERFACE STUDY", MDAC/TRW

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TWO DSCS-II/TRANSTAGE

(Space & Weight available for additional payload)



COMPOSITE C.G. (49,124#) - STA 1002

* 32,124# INCLUDES WT. OF TWO DSCS-II, TRANSTAGE & TRANSTAGE CRADLE

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HIGH ENERGY ORBITS OBSERVATIONS

- CURRENT DOD MISSION MODEL RESULTS IN SHUTTLE LOAD FACTORS OF 50% IN WEIGHT AND 30% IN VOLUME
- MISSION COMBINATIONS ARE LIMITED BY
 - SHUTTLE BAY LENGTH
 - DEFINED SPACECRAFT CONFIGURATION (LENGTH TO DIAMETER)
 - COMPACTNESS OF UPPER STAGES
 - DEFINED CAPABILITY OF IUS (LENGTH AND P/L)
 - NORMAL LANDING AFTER ABORT C.G. AND CONSTRAINTS
- HIGH ENERGY 63⁰ INCLINED MISSIONS CAN BE COMBINED WITH SYNCH EQ MISSIONS FOR DUE EAST ETR LAUNCH

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CURRENT SAMSO IUS GROUND RULES

- MINIMUM IUS RDT&E DOLLARS - SINGLE, LOW COST STAGE TO MEET DOD NEEDS
- SINGLE IUS FOR COMBINED DOD/NASA MISSION MODEL - MINIMIZE CHANGES TO COSTLY DOD PAYLOADS
- EXPENDABLE CAPABILITY ONLY - PAYLOAD AND STAGE COMPATIBLE WITH CURRENT LAUNCH VEHICLES

COMMITTEE 'WHY IUS' STUDY GROUND RULES

- MINIMUM TOTAL SATELLITE AND IUS NON-RECURRING AND RECURRING DOLLARS
- MAKE MOST EFFICIENT USE OF SHUTTLE
- MULTI-MISSION FLEXIBILITY FROM SINGLE SHUTTLE LAUNCH
- SIMPLE TRANSITION FROM CURRENT BOOSTER TO SHUTTLE
- EFFECTIVE APPROACH TO GET SATELLITE DESIGNERS TO START DESIGNING FOR SHUTTLE TODAY WITH OPTION TO FLY SHUTTLE OR CURRENT BOOSTER
- EXPENDABLE CAPABILITY ONLY
- FLY ALL 24-HOUR, 12-HOUR AND SUPER-SYNCHRONOUS MISSIONS FROM ETR

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ALL SOLID PERIGEE/APOGEE KICK MOTOR OPTION

- ADVANTAGE OF INDIVIDUAL SOLID MOTORS OVER IUS:
 - FEWER SHUTTLE FLIGHTS (31 vs 22)
 - FLEXIBILITY IN MULTIMISSION SATELLITE PLACEMENT
 - USE OF EXISTING ROCKETS FOR MOST MISSIONS (\approx 90 PERCENT)
 - POSSIBLE COST ADVANTAGE
- AREAS OF CONCERN:
 - KICK ROCKET DEVELOPMENT COSTS
 - KICK ROCKET vs IUS INTEGRATION COSTS
 - SHUTTLE SUPPORT STRUCTURE AND INTEGRATION COSTS
 - DEFINITION OF NON-DOD MISSION MODEL
 - KICK ROCKET INJECTION ACCURACY
 - SHUTTLE UTILIZATION

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TITAN III-SHUTTLE TRANSITIONING

● PROBLEMS

- SHUTTLE SCHEDULE UNCERTAINTY
- RELUCTANCE OF PAYLOAD PROGRAM OFFICES TO COMMIT TO SHUTTLE
- VOLUME AND WEIGHT CONSTRAINTS
- UNDETERMINED PERFORMANCE, SIZE, COST, AND SCHEDULE OF IUS

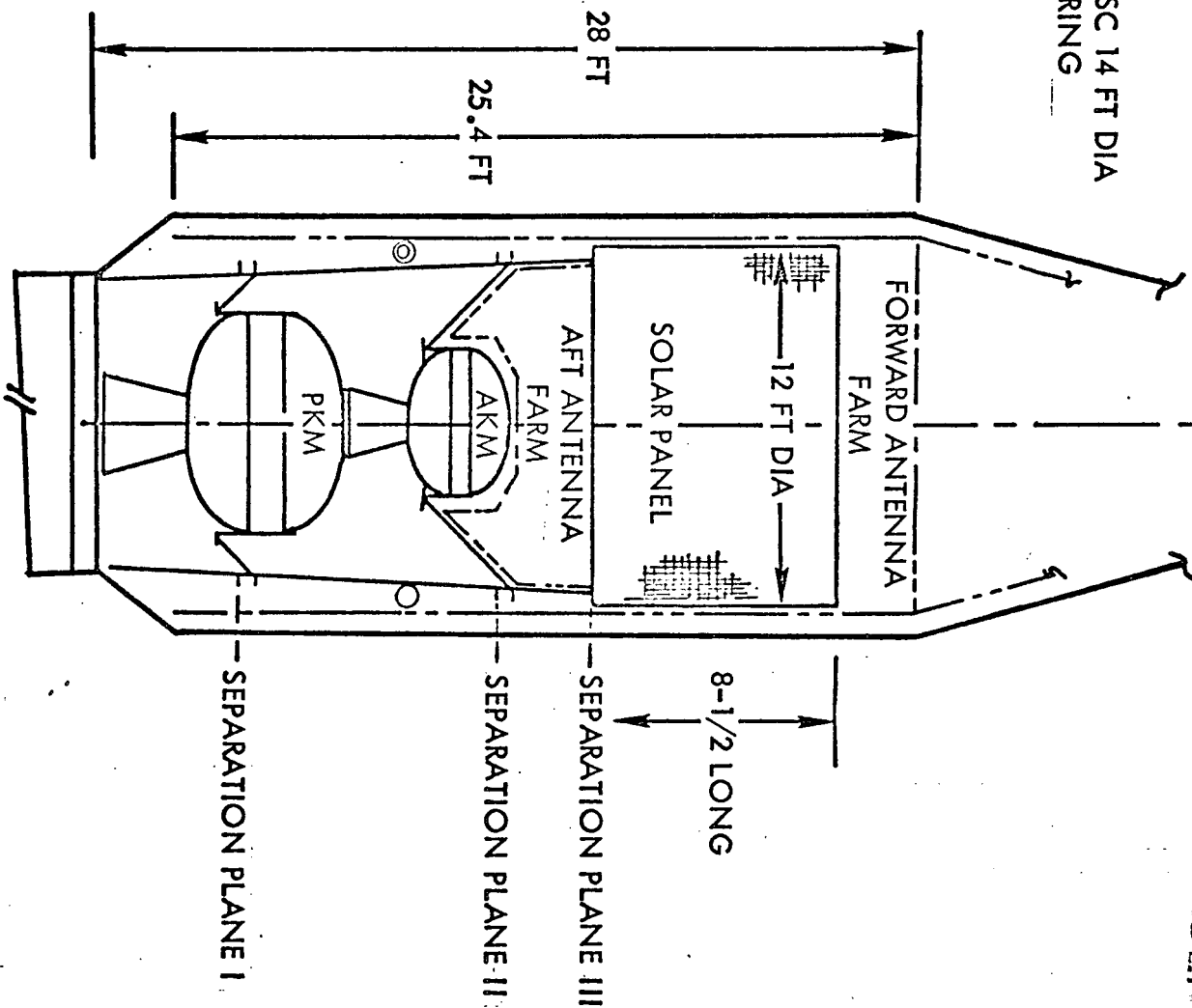
● POSSIBLE SOLUTION

- LARGE SHROUD ON TITAN III FAMILY
- SOLID AKM/PKM UPPER STAGE

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LMSC 14 FT DIA
FAIRING



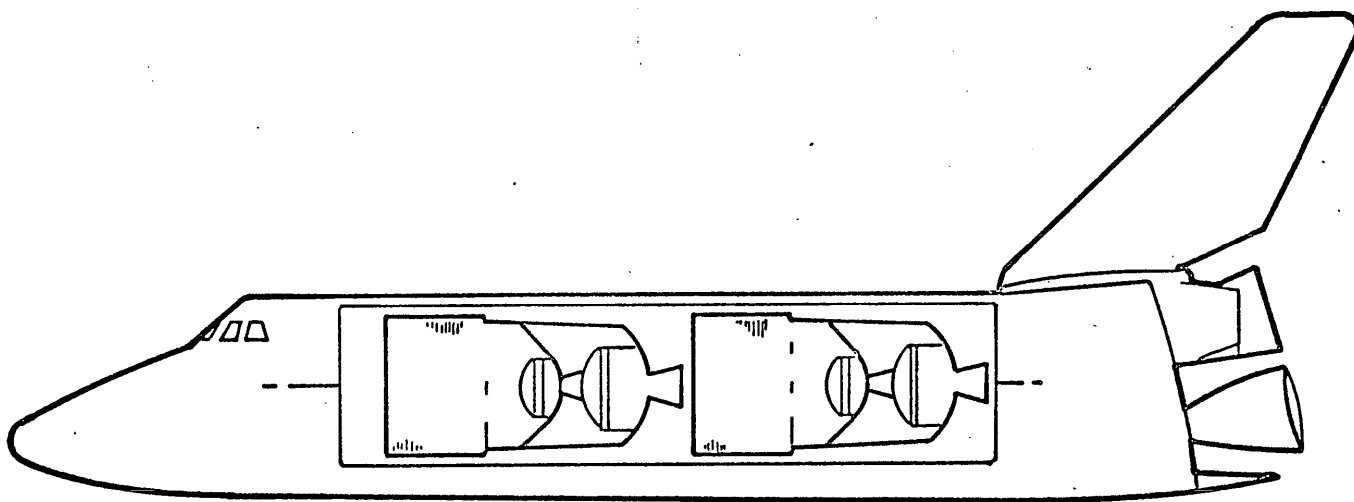
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TITAN 3D PAYLOAD CONFIGURATION

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SHUTTLE PAYLOAD



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ETR TITAN III CAPABILITY

- CONFIGURATION

- 14 FT. DIA. SHROUD
- SOLID AKM/PKM SPIN STABILIZED

- PAYLOAD CAPABILITY

- LOW EARTH ORBIT
- SYNCHRONOUS EQUATORIAL

T-IIIID / SOLIDS

- 28,500 LBS.
- 4,500 LBS.

T-IIIIC

- 27,400 LBS.
- 2,700 LBS.

- COST

- DEVELOPMENT & QUALIFICATION \$ 15.5M
 - T-IIIID & FACILITY \$ 6.5
 - AKM/PKM \$ 9.0
- RECURRING AKM/PKM \$ 1.0M

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AIR FORCE ACTIONS

- PREPARATION FOR OCTOBER 1975 DSARC ON SHUTTLE INCLUDES CONSIDERATION OF:
 - TITAN IIID AT EASTERN TEST RANGE
 - LARGE SHROUD ON TITAN III
 - SOLID ROCKET TRANSFER SYSTEMS

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CONTINUING EFFORTS

SHUTTLE APPLICATION TO

- GPS
- DSCS III
- MILITARY USES OF SHUTTLE
 - NEW MISSIONS
 - IMPROVED MISSION CAPABILITY
 - REDUCED COST

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